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## ABSTRACT

The research looking for cognitive factors specific to depression has resulted in the consistent finding that memory in depression is selective. The phenomenon of selective memory for negative events in depression was investigated using signal detection methods to separately examine the contributions of information processing deficits and response biases. The recognition memory performances of three psychiatric inpatient groups and a control group were compared for stimuli of depressed and nondepressed content under conditions of subject bias and experimenter bias. Subjects were 16 currently depressed, 16 previously depressed, and 16 nondepressed voluntary, female psychiatric inpatients at a private hospital in New England and 16 nonpsychiatric, nondepressed female hospital staff members. Subjects made self-descriptive ratings on 20 depressed and 20 nondepressed content adjectives which comprised the target memory set. Adjectives were then randomly assigned to one of two lists with each list containing equal numbers of depressed or nondepressed content targets and distractor adjectives which were semantically related to target adjectives. Adjectives were presented for recognition and subjects indicated whether the adjective was one they had rated. The findings suggest that a liberal response bias may explain selective memory for depressed content material in both depressed and previously depressed groups and appears to be depression specific. However, the selective memory of nondepressives for nondepressed content material appeared to be due to an information processing strategy which differed from that of depressives. (NB)

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SELECTIVE MEMORY IN DEPRESSION: Memory Deficit or Response Bias?

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Paper presented at the annual meeting of the Association for the Advancement of Behavior Therapy, Houston, Texas, November, 1985.

ABSTRACT

The phenomenon of selective memory for negative events in depression was investigated using signal detection methods to separately examine the contributions of information processing deficits and response biases. The recognition memory performances of three psychiatric inpatient groups (depressed, previously depressed, nondepressed) and a nonpsychiatric, nondepressed control were compared for stimuli of depressed and nondepressed content under two conditions: (1) Subject bias - the response bias that the subject brings to the task and (2) Experimenter bias - experimenter induced bias to decrease a hypothesized conservative response bias in depression.

Findings suggest that a liberal response bias may explain selective memory for depressed content material in both depressed and previously depressed groups and appears to be depression specific. However, the selective memory of nondepressives for nondepressed content material appears to be due to an information processing strategy which differs from that of depressives.

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# SELECTIVE MEMORY IN DEPRESSION: Memory Deficit or Response Bias?

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The search for cognitive factors specific to depression has resulted in the consistent finding that memory in depression is **selective**. Depressed subjects appear to selectively remember pessimistic, self-depreciating information, particularly when the information to-be-remembered is self-referent (e.g. Davis and Unruh, 1981; Derry and Kuiper, 1981). In comparison, non-depressed subjects are more inclined to remember positively valenced, self-referent information.

Numerous investigations have attempted to examine just where in the chain of information processing these memory distortions occur. Findings of deficits in information processing operations such as attention, encoding and retrieval have been equivocal due to (1) methodological considerations such as sampling and construct validity problems and (2) the failure to control for the rival hypothesis of differences in response biases between depressed and nondepressed samples.

More specifically, it may be that depressed and nondepressed subjects attend to, encode and remember positive and negative stimuli with equal accuracy but differentially report doing so. A response bias model of the selective memory phenomenon in depression would predict depressives to set a very liberal criterion for reporting depressed content recollections and a conservative criterion for reporting their recollections of nondepressed content.

Two recent investigations which have used a recognition memory paradigm and signal detection methodology (Miller and Lewis, 1977; Zuroff, Colussy and Weilgus, 1983) suggest that a response bias model may explain the selective

memory phenomenon in depression. Taken together, these studies suggest that depressives tend to be conservative in reporting neutral or positive content information and liberal in reporting negative, self-referent information. Neither of these studies found any evidence suggestive of a true memory impairment in depression, as measured by  $d'$ .

However, the absence of evidence for an information processing deficit in depression is not necessarily evidence of absence. There are a number of alternative explanations for the failure to detect true memory differences between depressed and nondepressed subjects in these two studies. Included among these are potential confounds such as: practice effects which tend to obscure differences in  $d'$ , failure to assess memory for the construct of interest, and external validity threats. The current investigation includes methodological refinements with regard to subject sample, experimental stimuli (construct validity) and memory assessment and attempts to address two questions. First, can a response bias explanation adequately account for the phenomenon of selective memory for self-referent, depressed content information in depression? Second, is the phenomenon mood-related, depression specific or found across different psychopathologies?

#### METHOD AND PROCEDURE

##### Subjects

Subjects were currently depressed ( $n=16$ ), previously depressed ( $n=16$ ) and nondepressed ( $n=16$ ) voluntary, female admissions to a private psychiatric hospital in New England. Also included was a comparison group of non-psychiatric, nondepressed ( $n=16$ ) subjects who were female, hospital staff members.

Currently depressed (CD) and previously depressed (PD) subjects received a diagnosis of nonpsychotic, nonbipolar, Primary Major Affective Disorder at

admission and at discharge, met DSM-III criteria for Major Depression Disorder, and obtained Beck Depression Inventory Scores (BDI; Beck, Ward, Mendelson, Mock and Erbaugh, 1961) of 20 or greater.

One goal of the study was to be able to examine memory performance within a group of "at risk" or depression prone individuals in the absence of depressed mood. Therefore, every other subject identified as "currently" depressed was assigned to the group which was later called "previously" depressed. These subjects were given the recognition memory task approximately three weeks after hospital admission whereas the CD subjects were tested within one week after admission. BDI scores obtained near the time of hospital admission indicated that CD and PD subjects were moderately to severely depressed and did not differ significantly from one another,  $t = -1.08$ ,  $p > .29$ . Mean BDI scores at the time of admission for CD and PD subjects were 33.6 and 37, respectively.

PD subjects were required to obtain a second BDI score of 16 or less and a minimum improvement of 10 points since the time of initial testing. The mean drop in BDI scores for this group was 28.9 points (range 17-38 points). PD subjects were significantly less depressed at the time of the experimental session than they were upon hospital admission,  $t(15) = -18.58$ ,  $p < .001$ .

Nondepressed, psychiatric (NDP) subjects did not receive a diagnosis of primary or secondary depression, had never been hospitalized for depression and obtained BDI scores of 16 or less. Admitting and discharge diagnoses in this group were all schizophrenic spectrum diagnoses.

The mean BDI scores of the four groups at the time of memory testing are presented in Table 1. The groups differed significantly in severity of depression,  $F(3,60) = 74.98$ ,  $p < .001$ . CD subjects were significantly more depressed than PD, NDP and NPND subjects ( $ps < .01$ ). PD, NDP and NPND subjects did not differ significantly from one another in severity of depression ( $ps > .10$ ).

### Procedure

Self-descriptiveness ratings were requested on 20 depressed and 20 non-depressed content adjectives to assure self-referent encoding and exposure to the target memory set. Forty "distractor" adjectives were included for the recognition task with each distractor being semantically related to a target adjective. Adjectives were randomly assigned to one of two lists (A & B) with the stipulation that each list contain equal numbers of depressed and non-depressed content targets and distractors.

Prior to the recognition memory task subjects were given one of two sets of instructions regarding their performance. They were told either to: (1) use their own rules about when to guess that they had rated a word when they were uncertain (subject bias) and (2) to guess that they had rated a word unless they were absolutely certain they had not (experimenter bias). The first set of instructions was constructed to assess the nature of the response bias a subject brings to the task. The second set of instructions was constructed on the assumption that depressed individuals set a very conservative response criterion such that they withhold affirmative responses in the face of uncertainty (Miller & Lewis, 1977). If this assumption is true, the "E bias" instruction, to venture a guess in the face of uncertainty, would be expected to result in a significantly less conservative response bias. A manipulation check indicated that the manipulation was successful. Response biases were significantly more liberal under "E bias" than under "Ss bias" instructions,  $t(63) = 2.24, p < .03$ . Order of list presentation and instruction set was completely counterbalanced. Adjectives were presented consecutively for recognition in a pre-established, random order. Subjects were asked to indicate whether the adjective was one they had rated (yes/no) and also to indicate their degree of certainty on a four-point scale where 1 = "very

uncertain" and 4 = "very certain."

## RESULTS

### **Memory for nondepressed content**

The subjects' recognition memory performances under the "Ss bias" instructions are presented in Table 2. Observe first the differences between the subjects in  $d'$  for positive content adjectives,  $F(3,60) = 3.17$ ,  $p < .03$ . Compared with the CD and PD subjects, NDP and NPND subjects were significantly better able to discriminate nondepressed content adjectives they had previously rated from those they had not, ( $p < .01$ ). This suggests that nondepressive subjects obtain better memory performances than depressive subjects due to enhanced memory sensitivity for this material.

### **Memory for depressed content.**

Similar group differences in memory sensitivity were not found for recognition memory of depressed content material ( $F < 1.00$ ). However, the groups did differ significantly in their response biases (beta) for reporting depressed content information,  $F(3,60) = 2.94$ ,  $p < .05$ . When only the clinical groups are considered, the assumptions of a response bias model are found. CD and PD subjects set a significantly more liberal criterion than NDP subjects for reporting recognition of depressed content, self-referent material.

The subjects' memory performances under "E bias" instructions replicated those reported above for both positive content recognition memory sensitivity,  $F(3,60) = 4.01$ ,  $p < .01$  and depressed content response bias,  $F(3,60) = 4.37$ ,  $p < .01$ .



DISCUSSION

Findings from the current investigation suggest that nondepressive and depressive subjects differ in their memory performances for positive content material due to information processing differences. As measured by  $d'$ , NDP and NPND subjects demonstrated heightened memory sensitivity for nondepressed content information. Since all subjects self-referently encoded, encoding deficits do not seem to explain the group differences. Nor does it appear that depressed mood interfered with the accessibility of nondepressed content material. PD subjects, whose mood was not significantly different from the NDP and NPND subjects, performed similarly to CD subjects. Lastly, the presence of psychopathology does not explain the group differences in memory sensitivity as the recognition memory sensitivity of the NDP subjects did not differ from that of the NPND subjects. This decrease in recognition memory sensitivity for nondepressed content, self-referent information therefore, appears to be, diagnostically, depression specific. Studies are currently underway in my lab to determine whether group differences in distribution of attention may underlie the enhanced memory sensitivity of nondepressives for positive content information.

In contrast to the finding of depressive/nondepressive differences in memory sensitivity for nondepressed content information, the enhanced memory of depressives for depressed content material was not found to be due to heightened memory sensitivity or accuracy. Rather, CD and PD subjects obtained their enhanced memory performances for depressed content due to the setting of a liberal bias toward reporting this material.

On the one hand, a difficulty for a response bias model is the finding that NPND subjects also set a liberal criterion for reporting their recognition of depressed content adjectives. On the other hand, when investigators



compare clinical and nonclinical samples, it is generally with the assumption that the nonclinical sample will demonstrate optimal performance. It may be that a liberal criterion for reporting negative, personal information must be coupled with accurate detection of positive, personal information to support a nondepressed, nonpsychopathological state of emotional health.

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TABLE 1

Mean BDI Scores at the Time of  
Recognition Memory Assessment

<u>GROUP</u>	<u>n</u>	<u>range</u>	<u>mean</u>	<u>sd</u>	<u>F</u>
Currently Depressed	16	21-52	33.6 <sub>a</sub>	10.7	74.98*
Previously Depressed	16	2-16	8.1 <sub>b</sub>	4.9	
Nondepressed Psychiatric	16	0-13	5.2 <sub>b</sub>	4.2	
Nonpsychiatric Nondepressed	16	0-9	3.1 <sub>b</sub>		

\*  $p < .001$

Note: Mean ratings with the same subscript are not significantly different. Scores with different subscripts differ significantly at the .05 level.

Table 2

A Summary of Recognition Memory Performances on  
Positive and Negative Content Adjectives (Ss bias)

Positive Content

<u>GROUP*</u>	<u>HITRATE</u>	<u>FALSE ALARM RATE</u>	<u>d'</u>	<u>beta</u>
CD	.87	.31	2.3 <sub>a</sub>	3.1 <sub>a</sub>
PD	.88	.44	1.7 <sub>a</sub>	0.4 <sub>a</sub>
NDP	.85	.22	2.8 <sub>b</sub>	3.1 <sub>a</sub>
NPND	.90	.30	3.1 <sub>b</sub>	1.9 <sub>a</sub>

Negative Content

CD	.84	.33	2.0 <sub>a</sub>	1.8 <sub>a</sub>
PD	.85	.32	1.9 <sub>a</sub>	1.7 <sub>a</sub>
NDP	.74	.19	2.3 <sub>a</sub>	5.7 <sub>b</sub>
NPND	.89	.38	2.0 <sub>a</sub>	0.5 <sub>a</sub>

\* CD = currently depressed, PD = previously depressed, NDP =  
nondepressed-psychiatric, NPND = nonpsychiatric-nondepressed.